WDEQ-AQD Meteorological Siting Criteria and Checklist

As a general rule, meteorological sensors should be sited at a distance beyond the influence of obstructions, such as buildings and trees; this distance depends on both the variable to be measured and the type of obstruction. The other general rule is that the measurements should be representative of meteorological conditions in the area of interest. Secondary considerations, such as accessibility and security, must be taken into account, but should not compromise the quality of the data.

Wind Instrument Siting Criteria:

The standard exposure of wind instruments over level, open terrain is 10 m above the ground; however optimum measurement height may vary according to data needs. Open terrain is defined as an area where the horizontal distance between the instrument and any obstruction is at least 10 times the height of that obstruction. An obstruction may be man-made (e.g., a building) or natural (a tree). A wind instrument should be securely mounted on a mast that will not twist, rotate, or sway. If a wind instrument must be mounted on the roof of a building, it should be mounted high enough to be out of the wake of an obstruction. Roof mounting is not a good practice and should only be resorted to when absolutely necessary. Sensor height and its height above the obstructions, as well as the character of nearby obstructions, should be documented.

Temperature Sensor Siting Criteria:

Temperature sensors should be mounted over a plot of open level ground at least 9 m in diameter. The ground surface should be covered with non-irrigated or un-watered short grass or, in areas where grass does not grow, natural earth. Gravel surfaces are also acceptable. The surface must not be concrete or asphalt or oil-soaked. The standard height for climatological purposes is 1.25 m to 2 m, but different heights may frequently be required in air quality studies. For general purposes, the primary temperature sensor is mounted 2 m above ground level, with the inlet facing away, and at a distance of approximately 1.5 times the tower diameter, from the tower.

The sensors should not be closer to obstructions, such as trees and buildings, than a distance equal to four times their height. They should be at least 30 m from large paved areas and not close to steep slopes, ridges, or hollows. Areas of standing water should also be avoided. Louvered instrument shelters should be oriented so that the door opens toward true north in the northern hemisphere. Motor-aspirated shields should also be oriented with the sensors toward true north in the northern hemisphere.

Rainfall and Precipitation Gauge Siting Criteria:

The gauge should be shielded from the wind but not placed in an area where there will be excessive turbulence caused by the shield. For example, a good location is an opening in an orchard or grove of trees where the wind speed near the ground is reduced by the canopy effect. A location open but for a few trees would be less desirable because of strong eddies that can be caused by the trees. Obstructions to the wind should not be closer than two to four times the obstruction height from the instrument. In open areas, a wind shield such as that specified by the NWS should be used. The ground surface around the rain gauge may be natural vegetation or gravel. It should not be paved so as to avoid splashing the gauge. The gauge should be mounted a minimum of 30 cm (approximately 1 foot) above the ground and should be high enough that it will not be covered by snow.

Relative Humidity Sensor Siting Criteria:

Relative humidity should be mounted over a plot of open level ground at least 9 min diameter. The ground surface should be covered with non-irrigated or unwatered short grass or, in areas where grass does not grow, natural earth. The surface must not be concrete or asphalt or oil-soaked. The standard

height for climatological purposes is 1.25 m to 2 m, but required heights may frequently be different in air quality studies.

The sensors should not be closer to obstructions, such as trees and/or buildings, than a distance equal to four times their height. They should be at least 30 m from large paved areas and not close to steep slopes, ridges, or hollows. Areas of standing water should also be avoided. Louvered instrument shelters should be oriented so that the door opens toward true north in the northern hemisphere. Motor-aspirated shields should also be oriented with the sensors toward true north in the northern hemisphere.

Solar Radiation Sensor Siting Criteria:

The site selected for an upward-looking pyranometer should be free from any obstruction above the plane of the sensor and should allow easy access for cleaning and maintaining the instrument. It should be located so that shadows will not be cast on the device and away from light-colored walls or other objects likely to reflect sunlight. A flat roof is usually a good choice; but if such a site is not possible, a rigid stand with a horizontal surface some distance from buildings or other obstructions should be used. A site survey of the angular elevation above the plane of the radiometer surface should be made through 360 degrees.

Barometric Pressure Sensor Siting Criteria:

The location of a barometer should be carefully considered in order for the equipment to accurately measure atmospheric pressure. A barometer should be placed in a location

- ► That has uniform, constant temperature
- ► That has good general lighting but is shielded from direct sunshine
- ► That is away from drafts and heaters
- ► Where it will have a solid, vertical mounting
- ► Where it will be protected against rough handling

Wind can cause dynamic changes in air pressure, therefore causing barometric readings to be inaccurate. Fluctuations from wind are superimposed on the static pressure and, with strong and gusty wind, may amount to 2 or 3 hPa. It is usually impractical to correct for such fluctuations because the "pumping" effect on the mercury surface is dependent on both the direction and force of the wind, as well as on the barometer's location. Thus the "mean value" will not represent the true static pressure.

Instrument Height and Exposure Checklist

Parameter	Distance	Meets Regulations Yes	No
Distance to nearest obstacle			
Distance to nearest paved road			
Is exposure outside 10X obstruction height			
Will instruments be on a rooftop			
Is exposure 1.5X height above the roof			
Height of WS sensor above ground			
Height of WD sensor above ground			
Arc of unrestricted flow			
Height of temperature sensor above ground			
Distance of temperature sensor from obstacles			
Is the distance 4X from obstruction height			
Arc of unrestricted flow			
Is temperature sensor shielded/motor aspirated			
Is the precipitation gauge on a roof			
Height of precipitation gauge above structure			
Distance to nearest obstacle			
Is exposure outside 2-4X obstruction height			
Is solar radiation mounted on a roof			
Height of solar radiation above structure			
Distance to nearest obstacle			
Will solar radiation sensor fall within a shadow			

Site Diagram or Photos:

*Please include approximate distance, structures, or obstacles.